ABSTRACT

A CPP-GMR spin value sensor structure with an improved MR ratio and increased resistance is disclosed. All layers except certain pinned layers, copper spacers, and a Ta capping layer are oxygen doped by adding a partial O_2 pressure to the Ar sputtering gas during deposition. Oxygen doped CoFe free and pinned layers are made slightly thicker to offset a small decrease in magnetic moment caused by the oxygen dopant. Incorporating oxygen in the MnPt AFM layer enhances the exchange bias strength. An insertion layer such as a nano-oxide layer is included in one or more of the free, pinned, and spacer layers to increase interfacial scattering. The thickness of all layers except the copper spacer may be increased to enhance bulk scattering. A CPP-GMR single or dual spin valve of the present invention has up to a threefold increase in resistance and a 2 to 3% increase in MR ratio.